Notice of Allowability	Application No.	Applicant(s)	
	10/542,819	FITZPATRICK, TERENCE JAMES	
	Examiner	Art Unit	
	Jafar Parsa	1621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *an application filed on 7/20/2005*.

2. ☒ The allowed claim(s) is/are *1-6*.

3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the:
      1. ☒ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 7/20/2005
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below.

Please enter the abstract. See the attachment.

Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Lewis on 6/19/2006.

The following is an examiner's statement of reasons for allowance:

Applicant's claimed invention is directed to a process for the synthesis of methanol, comprising the steps of: passing a preheated synthesis gas comprising hydrogen and carbon oxides at an elevated pressure through at least one uncooled fixed bed of a methanol synthesis catalyst wherein methanol synthesis is effected adiabatically, cooling the resultant partially reacted synthesis gas by heat exchange with a coolant after passage through each bed, passing the resultant cooled partially reacted synthesis gas through a fixed bed of a methanol synthesis catalyst disposed in a heat exchange reactor having tubes disposed therein through which a coolant is passed in a direction that is co-current with the flow of the partially reacted synthesis gas through the catalyst bed of said heat exchange reactor whereby further methanol synthesis is effected and the coolant is heated, cooling the resultant reacted synthesis gas to below the dew point of the methanol therein and separating methanol leaving a stream of unreacted gas, passing part of said unreacted gas, together with make-up gas

comprising hydrogen and carbon oxides, through said tubes as the coolant of said heat exchange reactor thereby producing the preheated synthesis gas to be fed to said at least one uncooled fixed bed of methanol synthesis catalyst.

US patent 5,827,901 is the closest prior art. US 5827901 describes a methanol synthesis process wherein preheated synthesis gas is reacted in a first reactor wherein the synthesis catalyst is disposed in tubes cooled by heat exchange with water boiling under an elevated pressure. The resultant reacted gas is then fed to a second synthesis reactor wherein further synthesis occurs. The product synthesis gas is then cooled and methanol is separated and the unreacted gas is recycled and fed, together with make-up gas, as the coolant in the second reactor. In the second reactor the coolant removes heat from the reacting synthesis gas, thus heating the coolant, which is then used as the pre-heated synthesis gas fed to the first heat exchange reactor. In the arrangement of US 5827901, the gaseous coolant, i.e. the recycled unreacted gas plus make-up gas, flows in a direction *counter-current* to the flow of the reacting synthesis gas.

Thus in distinction to the arrangement described in the aforesaid US 5827901, The synthesis gas used as coolant flows co-currently instead of counter-currently through the heat exchange reactor. Also the reactor cooled by boiling water is replaced by one or more uncooled beds of catalyst in which the synthesis proceeds adiabatically and the heat is recovered as a separate step after at least the first uncooled catalyst bed. Co-current, rather than counter-current, flow of the coolant is advantageous as it enables the tube-cooled bed to operate with a lower peak catalyst temperature (thereby increasing catalyst life and decreasing the amount of by-product formation) and enables

the temperature profile in the heat exchange reactor to match more closely the profile corresponding to the maximum rate of methanol synthesis. The comparative examples on page 9-13 of the specification (Example 1 according to the invention and Example 3 using counter current flow according to US 5,827,901) display the advantages of using the co-current flow and adiabatic reactors versus counter current flow and isothermal reactors.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jafar Parsa whose telephone number is (571)272-0643. The examiner can normally be reached on 8 a.m.-4:30 p.m. (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thurman Page can be reached on 571-272-0602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jafar Parsa
Primary Examiner
Art Unit 1621

JP

J. PARSA
PRIMARY EXAMINER